ARMIN LINKE - PROSPECTING OCEAN

Commissioned and produced by TBA21–Academy
Curated by Stefanie Hessler


ARMIN LINKE PROSPECTING OCEAN 23/5-30/9/2018

TBA21–Academy is proud to present its first major research commission, conceived and realized over three years by the artist and fellow of *The Current* Armin Linke.

Armin Linke
Prospecting Ocean, 2018
Main film, two-channel video installation, color, sound, ca 56 min
Lectures, two-channel video installation, color, sound, 240 min

Working through photography and filmmaking, Armin Linke looks at the institutional infrastructures, decision processes, and sites of power hierarchies, in many cases through an investigation of the archive and of the conditions and possibilities of the media itself.

Prospecting Ocean attempts to create a new visualization to frame the complex kaleidoscopic images that are connected with the Anthropocene into a linear narrative essay. The work aims at understanding and possibly creating new solutions to design the future. Exemplary issues are the acidification of the ocean, the implication of the usage of fertilizers, the practice of ice drilling to get information on the history of climate, ocean current measurement and modeling, negotiations on new legislations that relate to the ocean boundaries and regulations, and eventually economical practices like oil and mineral drilling, fisheries, issues related to vessel transport, and ice melting in the Arctic region.

Armin Linke investigates international regulations and laws related to the seabed and the rising sea levels. By combining film, photography, documentation, and interviews, he has selected various institutions, scientists and local agents, observing the different procedures, negotiations, interconnections that their activities implicate. Focusing on a selection of seminal conferences, Linke uses a combination of filmic material gathered, amongst other, from the 22nd Session of the International Seabed Authority in Kingston, Jamaica, as well as Committee on International Law and Sea Level Rise, Johannesburg/Sandton, South Africa. The documentation of the conferences will be combined with footage gathered in the field on various research trips investigating similar themes, which feed back into these conferences.

Camera: Armin Linke, Giulia Bruno
Sound and sound postproduction: Giuseppe Ielasi, Renato Rinaldi
Editing: Giulia Bruno, Giuseppe Ielasi

For the premiere of *Prospecting Ocean*, Armin Linke and TBA21–Academy joined forces with the **Istituto di Scienze Marine** (CNR-ISMAR) and developed an investigative exhibition, presented at ISMAR's former offices and laboratories in Venice in summer 2018.

Drawing upon rare footage of the deep-sea and interviews with leading scientists, policymakers, legal experts, and activists, the project scrutinizes the aesthetics of technoscientific apparatuses and grapples with the tension between ecological protection of our oceans and political and economic exploitation.

Linke's *Prospecting Ocean* presents a rich choreography of newly filmed footage and archival materials exhibited in the former headquarters and laboratory spaces of CNR-ISMAR, including several multi-channel video installations and a new series of photographs. A montage of rarely seen scientific footage of the ocean floor—captured by remotely operated underwater vehicles (ROV) at a depth of up to 5,000 meters—visually juxtaposes the "natural" seabed with the machinery used to extract specimen for research and deep-sea minerals for industrial use. Next to these highly detached images of tools and clinical incisions in the seabed, the exhibition presents imagery filmed at assemblies at the UN, in international law conferences, at marine research centers, and at sites endangered by sea level rise and now also seabed mining in Papua New Guinea.

Linke exposes submarine and terrestrial sites that are commonly invisible and accesses the meetings of decision makers that are usually closed off to the public. Scrutinizing the infrastructural apparatuses administrating the seabed, Linke deconstructs the idea of a marine-based blue economy and policy commonly supported by governments.

At CNR-ISMAR, the footage filmed by Linke and his team is presented alongside behind-the-scenes interviews of leading biologists, geologists, and policymakers, as well as footage of activist movements in Papua New Guinea, inviting the viewer to consider the implications of oceanic excavations on both the environment and communities. Linke lays bare an intricate network of dynamics, dissecting how information is negotiated between scientific, legal, and economic entities and institutions, on both local and international levels.

Prospecting Ocean also features a selection of primary documents and books from the CNR-ISMAR historical library selected by the institute's scientists and critical texts analyzing the legal, political, and economic infrastructures presiding over the allocation of ocean resources. Taken together, the project scrutinizes the administration of the oceans and exposes the simultaneous fascination with and alienation from technologies that map, visualize, and exploit resources in the sea.

Curator and text: Stefanie Hessler


Thyssen-Bornemisza
Art Contemporary
Academy
ISMAR
Consiglio Nazionale delle Ricerche - Istituto di Scienze Marine
ARMIN LINKE
PROSPECTING

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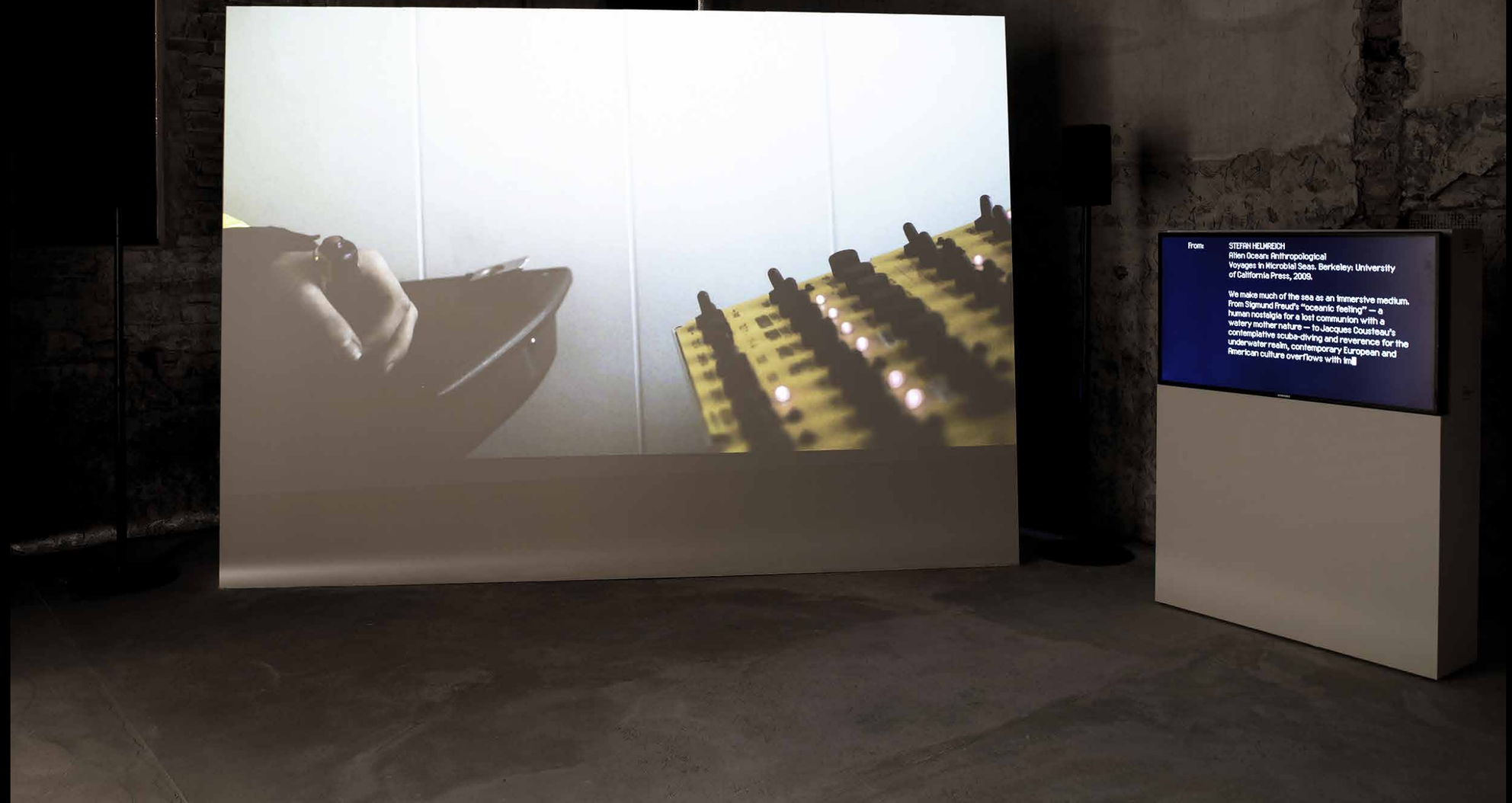
From:
STEFAN HELMREICH
Alien Ocean: Anthropological
Voyages in Microbial Seas. Berkeley: University
of California Press, 2009.
We make much of the sea as an immersive medium.
From Sigmund Freud's "oceanic feeling" — a
human nostalgia for a lost communion with a
watery mother nature — to Jacques Cousteau's
contemplative scuba-diving and reverence for the
underwater realm, contemporary European and
American culture overflows with ima

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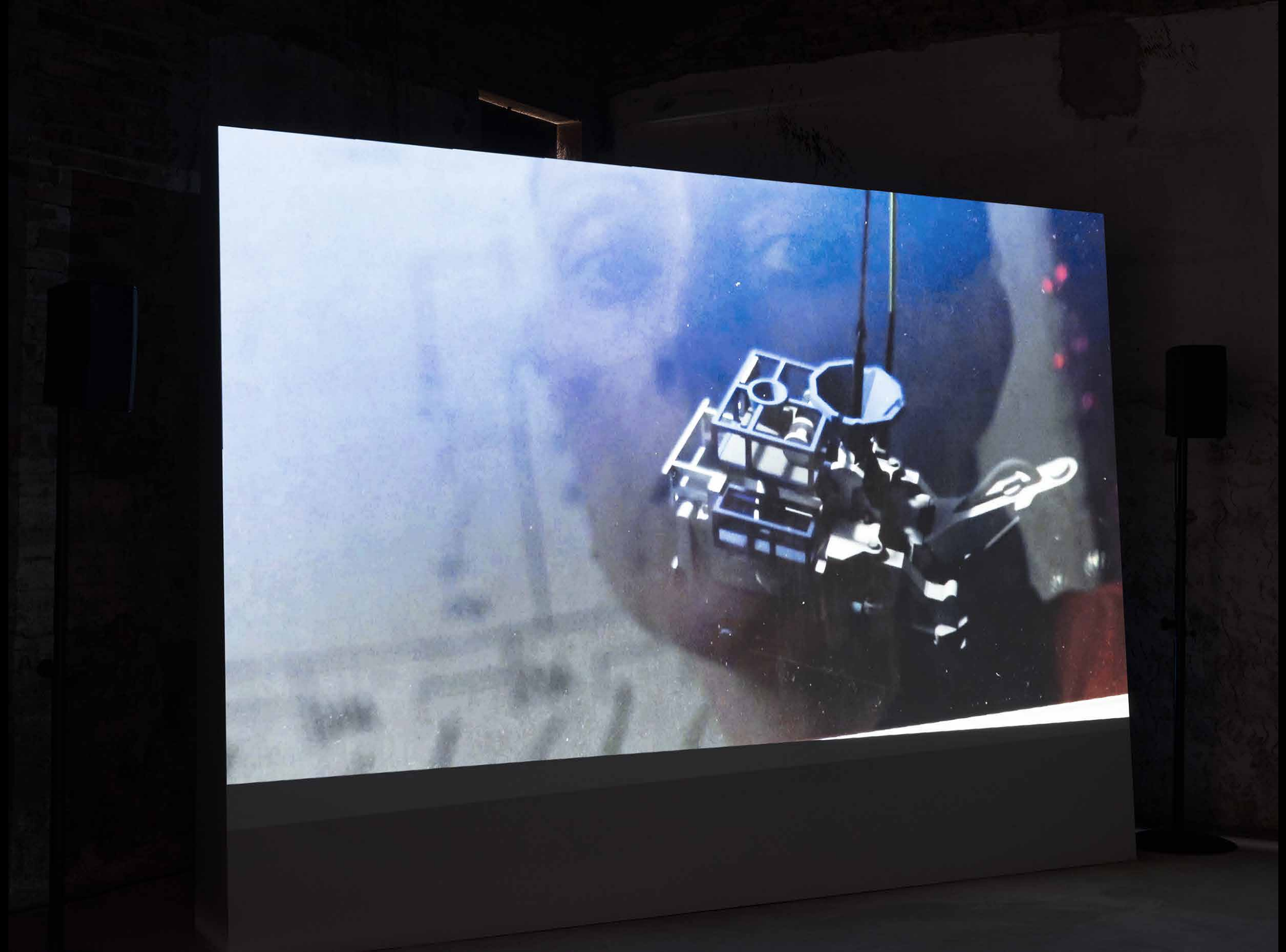

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Armin Linke's film *Prospecting Ocean* (2018) is the centerpiece of his three-year research commission. Accompanied by a monitor with commentaries by scientists, legal experts, and activists, the film begins with abstract imagery captured at night at the Norwegian University of Science and Technology (NTNU) in Trondheim. The scenes oscillate between a distant, mediatized gaze and scientific fascination, focusing on technological devices employed to gauge and map subaquatic depths that remain invisible to the bare eye. The use of the technologies developed and tested here is mediated by legislation intended to reconcile the conflicting interests of scientific exploration, commercial extraction, and environmental protection.

Mapping out the history of international regulatory systems and their contemporary applications, Linke assembled interviews with legal experts with scenes from the United Nations conference on the future of the oceans. The presence of Fiji, viewed here indirectly via a recording screen, grants a first glimpse into the diverging stakes of oceanic stewardship and international extraction agendas.

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Also included are filmed interviews with scientists such as Ann Vanreusel, head of the Marine Biology Research Group at Ghent University, and Antje Boetius, professor of geomicrobiology at the Max Planck Institute for Marine Microbiology at the University of Bremen. These researchers grant insights into the environmental implications of seabed mining, technological devices applied in mineral extraction, and the role that hydrothermal vents play in biodiversity and the health of ecosystems.

The film ends with scenes filmed by Linke and his team in Papua New Guinea, where mining operations in national waters are about to commence, instigated by the international company Nautilus Minerals Inc. The camera captures images of quotidian life in proximity to the oceans and local activist groups concerned with the negative ecological, societal, and economic impacts of deep-sea mining. These scenes raise questions regarding self-determination and foreign dependency of economically deprived regions such as Papua New Guinea, pointing to the distributed complex of infrastructural and legal systems that the architect and researcher Keller Easterling has called “extrastatecraft.”

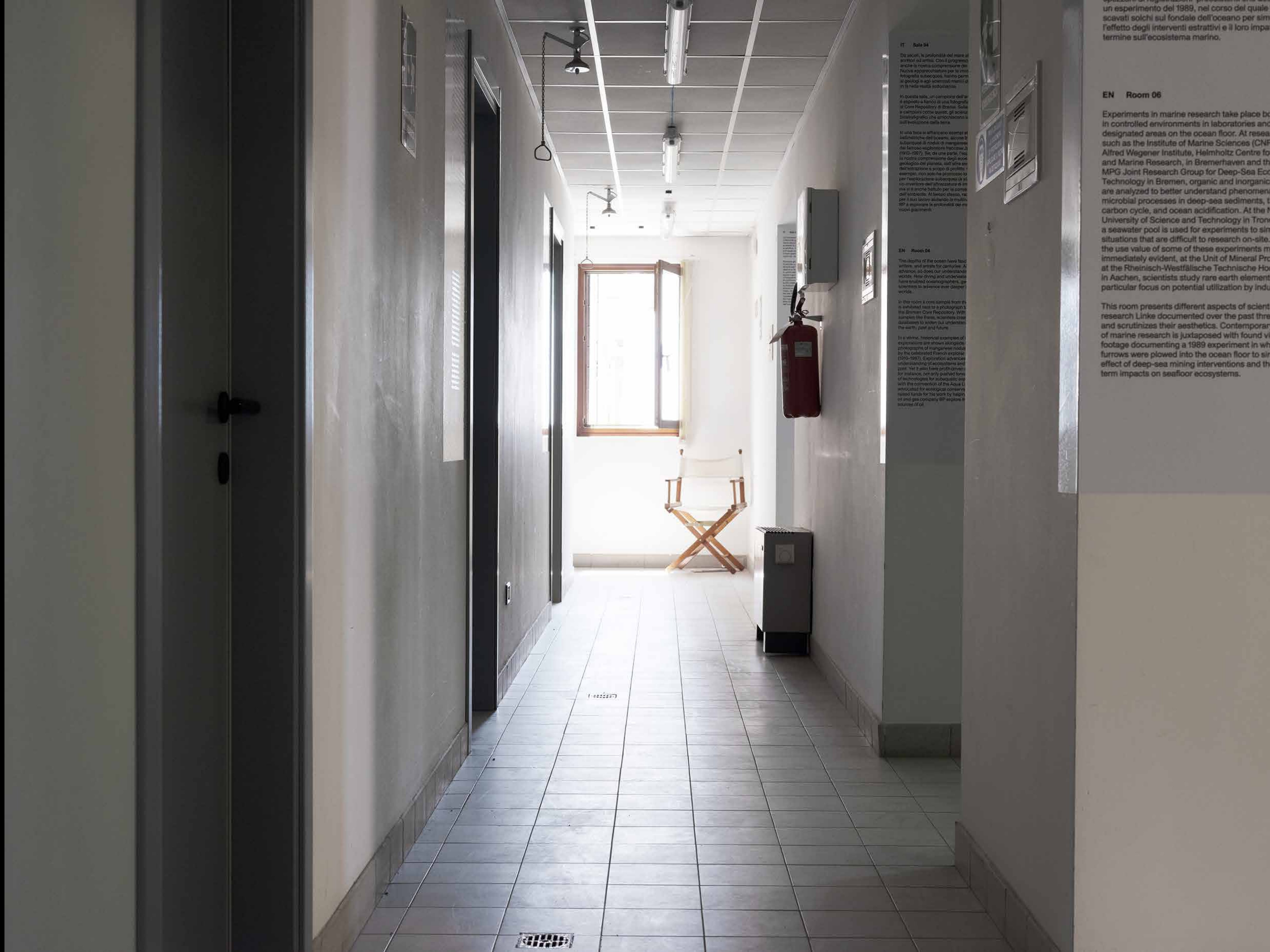
ISMAR

ARMIN LINKE PROSPECTING OCEAN

01

In the staircase leading to the second part of the exhibition, a six-channel sound installation, conceived by Giuseppe Ielasi, with the voice of the anthropologist Stefan Helmreich of Massachusetts Institute of Technology (MIT) in Cambridge considers shifting relationships between the natural and cultural worlds. Helmreich discusses the reconfigurations of biological categories as scientists discovered hydrothermal vents and deep-sea bacteria in the 1970s. These novel findings urged them to ask fundamental questions regarding what constitutes an organism and how life can evolve in such extreme conditions.

The invisible and the subvisible have inspired scientists to use the language of science fiction and extraterrestriality to discuss these novel and strange microbial creatures. Helmreich considers different scales, from the microscopic and intimately bodily to planetary interconnected ecosystems. At the same time these findings have opened up a new frontier for prospecting, which reinstalls inequalities underwritten by long histories of the extraction of minerals from indigenous lands.


un esperimento del 1989, nel corso del quale
scavati solchi sul fondale dell'oceano per
l'effetto degli interventi estrattivi e il loro
termine sull'ecosistema marino.
EN Room 06
Experiments in marine research take place
in controlled environments in laboratories and
designated areas on the ocean floor. At
such as the Institute of Marine Sciences
Alfred Wegener Institute, Helmholtz Centre for
and Marine Research, in Bremerhaven and the
MPG Joint Research Group for Deep-Sea
Technology in Bremen, organic and inorganic
are analyzed to better understand phenomena
microbial processes in deep-sea sediments,
carbon cycle, and ocean acidification. At the
University of Science and Technology in
a seawater pool is used for experiments to
situations that are difficult to research on-site.
the use value of some of these experiments
immediately evident, at the Unit of Mineral
at the Rheinisch-Westfälische Technische
in Aachen, scientists study rare earth elements
particular focus on potential utilization by
This room presents different aspects of
research Linke documented over the past
and scrutinizes their aesthetics. Contemporary
of marine research is juxtaposed with found
footage documenting a 1989 experiment in
furrows were plowed into the ocean floor to
effect of deep-sea mining interventions and the
term impacts on seafloor ecosystems.

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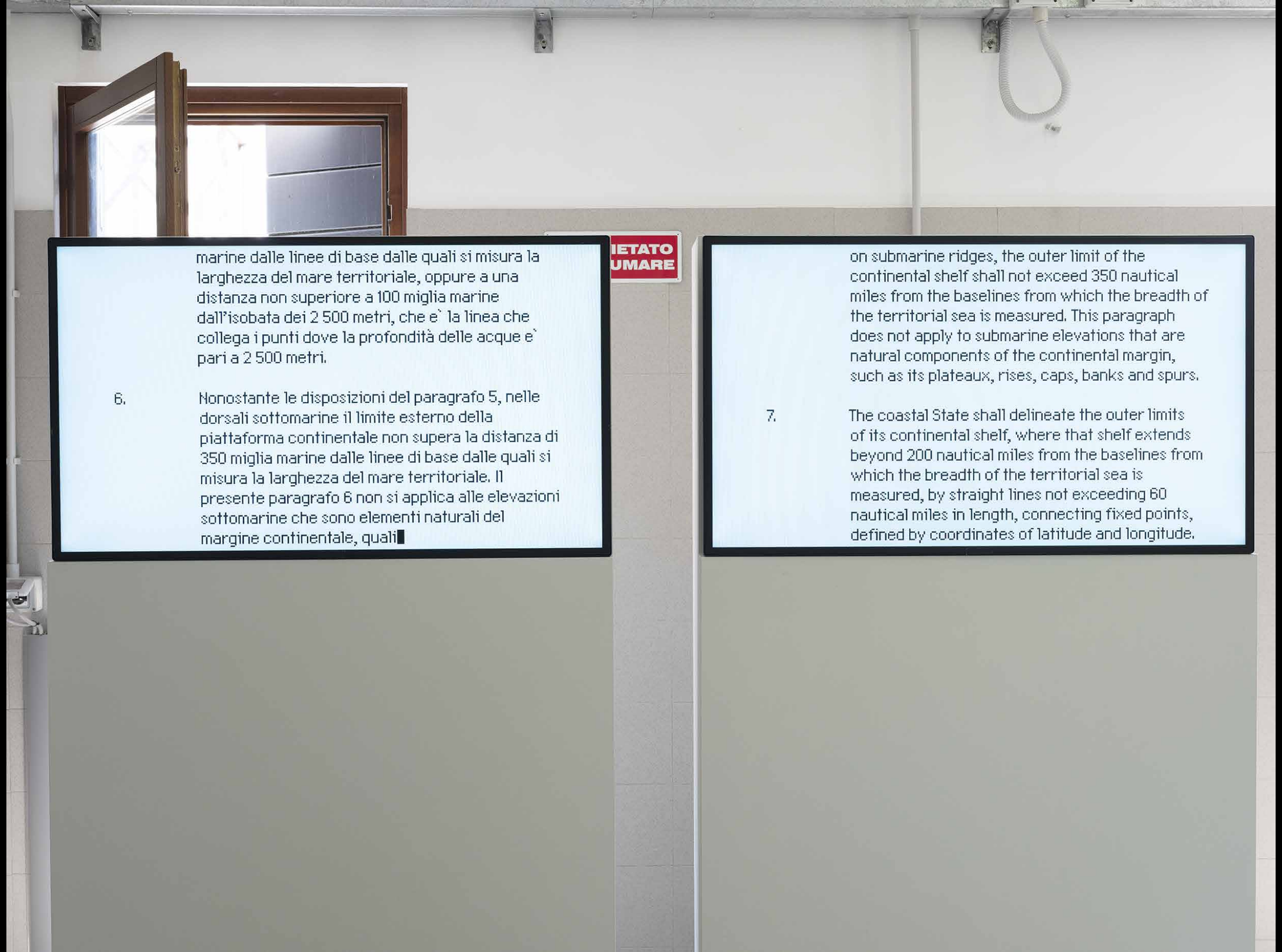

marine dalle linee di base dalle quali si misura la larghezza del mare territoriale, oppure a una distanza non superiore a 100 miglia marine dall'isobata dei 2 500 metri, che e` la linea che collega i punti dove la profondità delle acque e` pari a 2 500 metri.

6. Nonostante le disposizioni del paragrafo 5, nelle dorsali sottomarine il limite esterno della piattaforma continentale non supera la distanza di 350 miglia marine dalle linee di base dalle quali si misura la larghezza del mare territoriale. Il presente paragrafo 6 non si applica alle elevazioni sottomarine che sono elementi naturali del margine continentale, quali

on submarine ridges, the outer limit of the continental shelf shall not exceed 350 nautical miles from the baselines from which the breadth of the territorial sea is measured. This paragraph does not apply to submarine elevations that are natural components of the continental margin, such as its plateaux, rises, caps, banks and spurs.

7. The coastal State shall delineate the outer limits of its continental shelf, where that shelf extends beyond 200 nautical miles from the baselines from which the breadth of the territorial sea is measured, by straight lines not exceeding 60 nautical miles in length, connecting fixed points, defined by coordinates of latitude and longitude.

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The ratification of the United Nations Convention on the Law of the Sea (UNCLOS) in 1982 marked a radical territorial shift. While protecting the high seas from monopolizing claims, the agreement also territorialized formerly undefined ocean space. It expanded the territory of coastal states to 12 nautical miles and that of their contiguous zones to 24 nautical miles and established an exclusive economic zone (EEZ) of 200 nautical miles in the surrounding waters or up to the margin of the continental shelf.

The continental shelf is a crucial concept. According to UNCLOS Article 76, “the continental shelf of a coastal state comprises the seabed and subsoil of the submarine areas that extend beyond its territorial sea throughout the natural prolongation of its land territory to the outer edge of the continental margin, or to a distance of 200 nautical miles from the baselines from which the breadth of the territorial sea is measured where the outer edge of the continental margin does not extend up to that distance.” It may not exceed 350 nautical miles from the baselines; this limitation, however, “does not apply to submarine elevations that are natural components of the continental margin, such as its plateaus, rises, caps, banks and spurs.”

02

Today tensions caused by territorial claims gain further urgency. Many coastal states are still defining their continental shelves based on recommendations issued by the Commission on the Limits of the Continental Shelf. As sea levels rise, however, the baselines of island states such as Kiribati are facing dramatic change. International bodies currently discuss whether baselines should be frozen and, if so, when to set the starting date. This not only affects future access to essential resources such as fish but also raises questions of nationhood and land rights. Does a country without any surface area above water cease to exist? What happens to the spiritual legacy, the graves and sacred sites—often trees, rocks, or sandbanks—if they are submerged in water and disappear?

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The International Tribunal for the Law of the Sea (ITLOS) in Hamburg began operating in 1996, fourteen years after UNCLOS was ratified. ITLOS is one of four means available to parties to settle disputes with regard to UNCLOS, along with the International Court of Justice (ICJ), arbitration under Annex VII of UNCLOS, and special arbitration under Annex VIII. ITLOS, which is organized similarly to the ICJ, has jurisdiction over a dispute, however, only if both parties have agreed to abide by it.

The main aim of ITLOS is to settle disputes in accordance with the rules of international law relating to the conservation of living marine resources. Resources from the sea encompass a wide variety of forms and uses. Besides living marine resources, which are crucial as nutrition and for the balance of ecosystems, they include territory and minerals but also knowledge. Publicly and privately funded research initiatives, from universities to government initiatives, military and industries, aim to increase their level of information and consequently financial profit. Attempts to increase profits, however, are mostly diametrically opposed to ecological conservation efforts.

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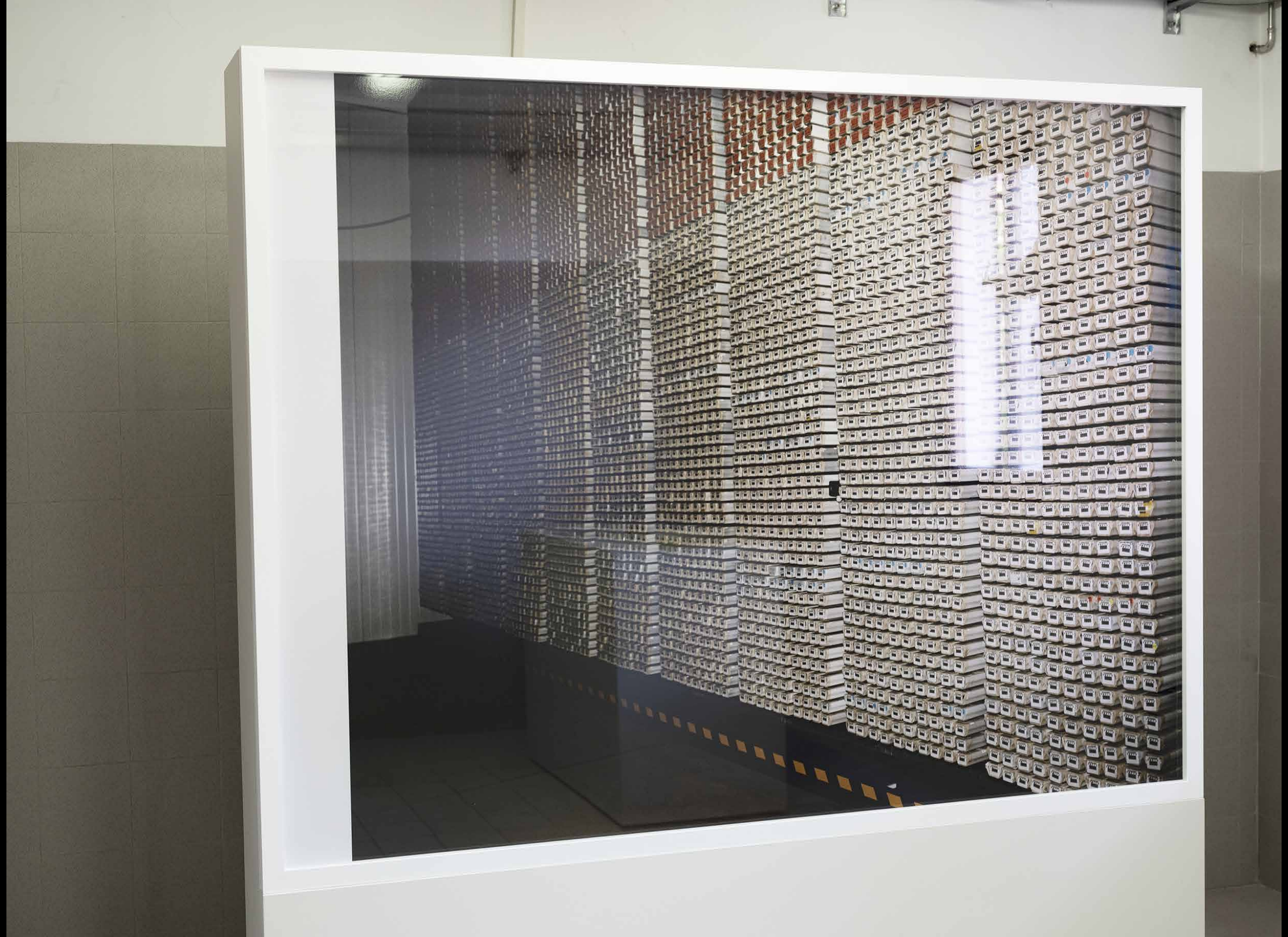

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Extended deep-sea research became possible thanks to the development of new technologies in the 1970s, such as the multibeam echosounder, which is used to produce exact measurements of the seafloor from the water surface. The development of remotely operated vehicles (ROVs) enabled the extraction of deep-water samples and specimens, while the invention of underwater cameras made it possible to visualize subaquatic worlds that were previously hidden from our eyes.

As early as 1953 the American geologist and oceanographic cartographer Marie Tharp discovered the 16,000-kilometer-long Mid-Atlantic Ridge. Before the age of computers, Tharp crunched numbers collected from sonar soundings by the geologist Bruce C. Heezen, used to investigate oceanic topographies since the 1930s. Because of her gender it was only later in her career that Tharp could join research expeditions herself. As she mapped out the bathymetric data, she found a massive valley in the middle of the ocean.

Her discovery led to a paradigm shift in science toward theories of plate tectonics and continental drift. Drilling samples taken from ocean sediments, such as the one from CNR-ISMAR displayed in this room and studied at the Bremen Core Depository, depicted in a photograph by Linke, can broaden our understanding of the earth, beyond geological events, climate and ocean change, deep-sea life, deep-sea processes, and their effects on the surface environment and geological hazards. At the same time research is often fueled by economic interests, and science is sponsored by industries with an interest in profit.

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del miliardario Howard Hughe, per l'est
in profondità. Questo primo tentativo di recupero fu,
tuttavia, fallimentare e, durante la fase di progettazione
di una seconda missione, dei ladri penetrarono
nell'ufficio di Hughes di Los Angeles rubando documenti
segreti che svelavano la realtà dei fatti, successivamente
resi pubblici dalla televisione nazionale nel 1975.

Come conseguenza, i sovietici mandarono una nave
a monitorare il sito del ritrovamento, e la Casa Bianca
cancellò ogni ulteriore tentativo di recupero. I viaggi,
sponsorizzati da grandi industriali, furono abbandonati
fino alla fine degli anni '90, quando una compagnia
petrolifera statunitense restaurò la nave, che è ancora
oggi in servizio per trivellazioni petrolifere ed esplorazioni
marine con il nome di GSF *Explorer*.

EN Room 05

Only three years after the American entrepreneurial
mining scientists John Mero published his study on the
lucrative potential of deep-sea minerals, the prospect
of seabed mining was used as a cover-up story for a
Cold War mission. In 1968 K-129, a Soviet submarine
carrying three nuclear missiles, was lost at sea. After
the Soviets abandoned their search efforts, the United
States located the vessel at a depth of 5,000 meters and
around 3,000 kilometers northeast of Hawaii. In order
to retrieve invaluable intelligence, the CIA decided
to recover the submarine. Since the operation had to
be carried out in absolute secrecy, the agency invented
a cover-up story. An ostensibly commercial deep-sea
mining vessel built and owned by the billionaire Howard
Hughes was sent to sea. After a first failed recovery
attempt, during the planning for a second mission,
thieves broke into Hughes's Los Angeles office and
stole secret documents revealing the plot. In 1975
the story broke on national television.

As a result the Soviets assigned a ship to monitor
the recovery site, and the White House canceled
further recovery operations. The voyages, which were
sponsored by industry leaders, were abandoned until
the late 1990s, when a US petroleum company restored
the ship. Under the name GSF *Explorer* it was still used
in deep-sea oil drilling and exploration until recently.

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At the height of the Cold War, deep-sea mining served as a cover-up story for a top-secret CIA mission aimed at recovering the sunken Soviet submarine K-129. Under the auspices of the billionaire Howard Hughes, a ship was sent to retrieve the vessel with the hope of gathering valuable intelligence. The public was told that the boat was a commercial deep-sea mining vessel owned by Hughes. After a series of mishaps, however, journalists broke the story in 1975, and the CIA aborted the mission. Today the formerly fictitious prey of this conspiracy—manganese nodules—has become the actual target of prospecting endeavors. Ironically in the 1990s Hughes's ship was restored for actual use in deep-sea oil drilling and exploration, and it is still being deployed for that purpose today.

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Arnon Linka
Norwegian University of Science and Technology NTNU, Department of Marine Technology, Trondheim, Norway, 2016
Stampa lambda montata su alluminio-Dibond con cornice in legno e vetro, 50 × 60 cm
IT
Fotografia di un sommozzatore che esplora un modello replicante la situazione di un pozzo petrolifero, Scattata dalla facoltà di Tecnologie Marine dell'Università di Scienze e Tecnologie di Trondheim, Norvegia, 2016. Il sommozzatore fa ovvi la alla it segno che convenzionalmente significa OK. In considerazione dell'impatto ambientale delle installazioni petrolifere, l'immagine spinge a considerare se effettivamente i tendoni-marini siano in stato di salute.
Arnon Linka
Norwegian University of Science and Technology NTNU, Department of Marine Technology, Trondheim, Norway, 2016
Lambda print mounted on alu-dibond with wooden frame and glass, 50 × 60 cm
EN
This photograph of a diver explaining a laboratory replica of an oil field was taken at the Department of Marine Technology at the Norwegian University of Science and Technology, Trondheim, in 2016. With his fingers, the diver is showing the signal for OK in world sign language. Considering the environmental effects of many-wise oil drilling, the image calls into question whether the situation is actually OK.

06

Armin Linke

Norwegian University of Science and Technology NTNU, Department of Marine Technology, Trondheim, Norway, 2016

Stampa lambda montata su alluminio-Dibond con cornice in legno e vetro, 50 × 80 cm

IT

Fotografia di un sommozzatore che esplora un modello replicante la situazione di un campo petrolifero. Scattata dalla facoltà di Tecnologia Marine dell'Università di Scienza e Tecnologia di Trondheim, Norvegia, 2016. Il sommozzatore fa con le dita il segno che convenzionalmente significa OK. In considerazione dell'impatto ambientale delle trivellazioni petrolifere, l'immagine spinge a considerare se effettivamente i fondali marini siano in stato di salute.

Armin Linke

Norwegian University of Science and Technology NTNU, Department of Marine Technology, Trondheim, Norway, 2016

Lambda print mounted on alu-dibond with wooden frame and glass, 50 × 80 cm

EN

This photograph of a diver exploring a laboratory replica of an oil field was taken at the Department of Marine Technology at the Norwegian University of Science and Technology, Trondheim, in 2016. With his fingers, the diver is showing the signal for OK in scuba sign language. Considering the environmental effects of deep-sea oil drilling, the image calls into question whether the situation is actually OK.

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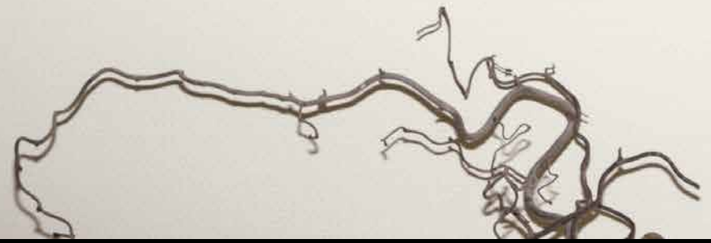
Havbassenget ble offisielt åpnet i 1981.
Lengde: 80 m - Bredde: 50 m - Dybde: 0-10 m



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In 1989, under the aegis of the former Ministry of Science and Technology of the Federal Republic of Germany, an area in the seabed in the Peru Basin in the southeast Pacific Ocean was plowed to simulate and research the long-term effects of deep-sea mining. The disturbance and recolonization (DISCOL) experiment in a 10.8-kilometer-diameter field proved that seven years after the intervention the disturbed area was still significantly species-depleted.

When harvesting nodules, deep-sea mining machines stir up sediment, and ocean currents move the clouds to adjacent areas. When the sediments settle, they can suffocate sensitive organisms, particularly immobile ones but also snails, sea cucumbers, and worms. Further, organisms are pumped up together with the nodules and die during the surface filtering process. The machines create noise and vibrations, disturbing marine mammals and their migration routes. Sediment clouds are also created when water is released back from the barges, affecting the growth of algae and other planktonic organisms.

On view in this room is documentation of the DISCOL experiment along with photographs taken at research institutions such as the Norwegian University of Science and Technology (NTNU), scrutinizing scientific methods and making visible laboratory simulation settings that are usually inaccessible to the public.

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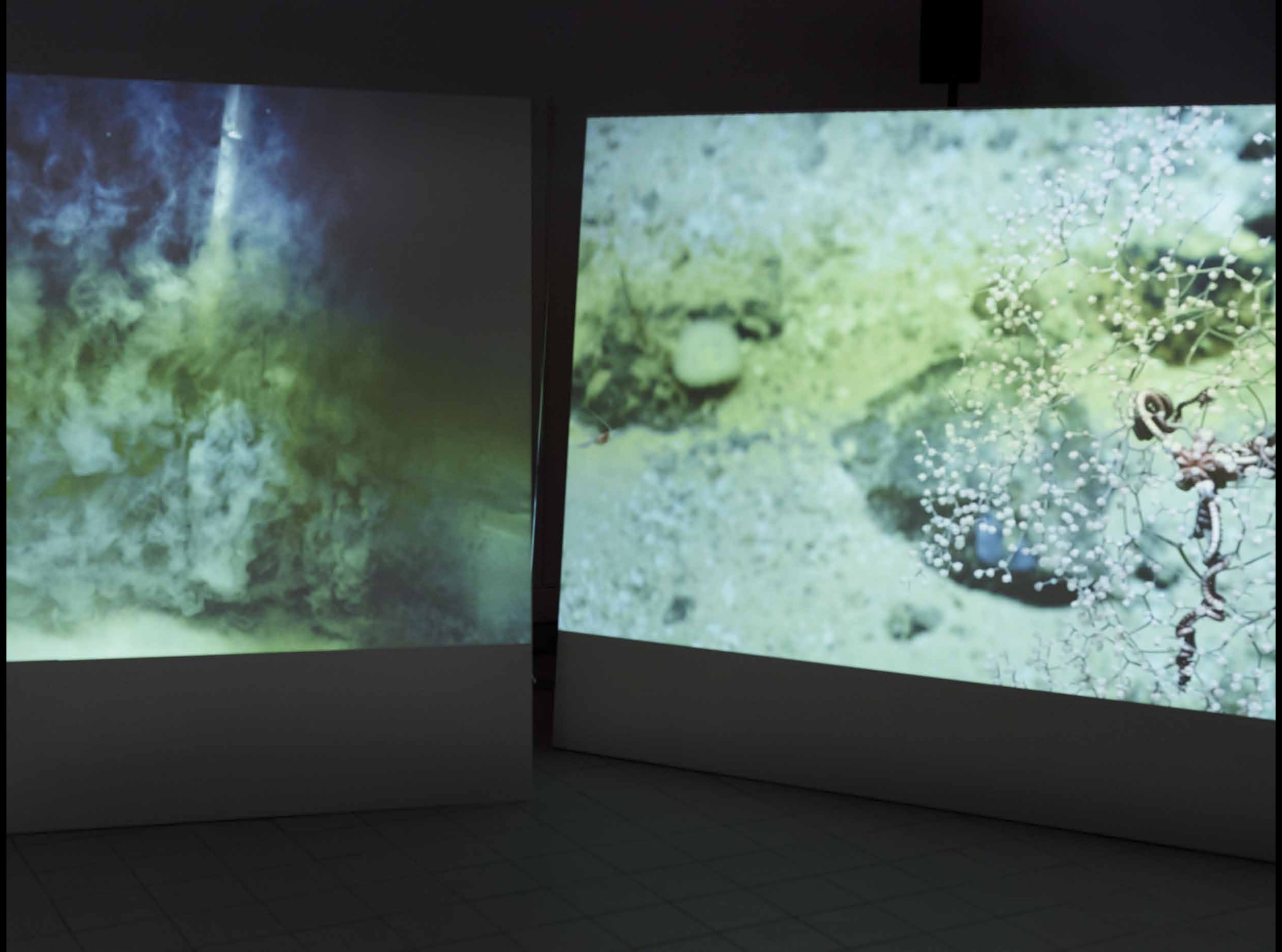

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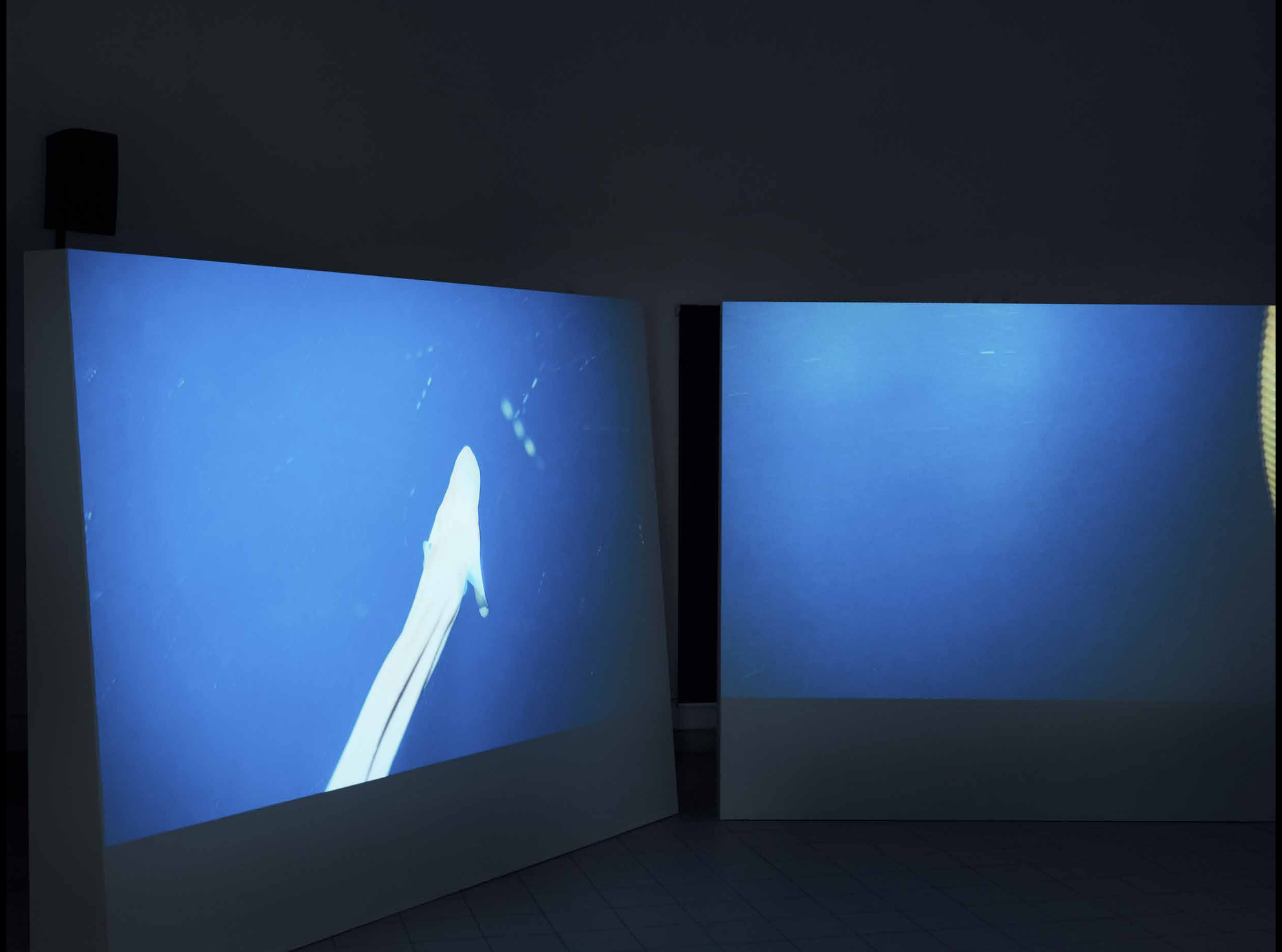

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The imagery deployed in this three-channel video installation was assembled and edited by Linke and his team from footage provided by the GEOMAR and MARUM research institutes in Kiel and Bremen. The footage was filmed by ROVs in depths of up to 5,000 meters. The videos look almost meditative, as if documenting an underwater choreography executed by robotic arms, whereas the aim is to extract specimens for study in the laboratory. On an accompanying monitor, precise information about the site and time of the extraction is displayed alongside details on the purpose of the collections. Comments by researchers from various disciplines evaluate the material from their respective positions, putting it into a broader context.

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Libro di lettura per le classi IV e V delle scuole elementari delle regioni Romagna e Veneto, approvato e premiato dal Ministero della Pubblica Istruzione (1901)
Reading book for classes 4 and 5 of elementary schools in the regions of Romagna and Veneto approved and awarded by the Ministry of Education (1901)
Collection of the Institute of Marine Sciences CNR-ISMAR Archivio Studi Adriatici


NEW VOLCANIC ISL
G. W. SMYTHE
View of Graham Island (ca. 1832)
Private collection of Marzia Rovere and Luigi Vigliotti

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The displays in this room were assembled in collaboration with scientists at CNR-ISMAR, drawing on material from the archive and enriched by notes and comments connecting historical phenomena of cartography as well as territorial and economic interests with scientific research and the public dissemination of knowledge.

Among the exhibited materials are valuable maps, such as Vincenzo Maria Coronelli's *Atlante Veneto* (Venetian Atlas; 1690–1701) and Anthony Jacobsz's *t'Nieuw Groot Straets-Boeck Inhoudende d'Middellantse Zee* (The new great straits book including the Mediterranean Sea, 1654), next to an 1882 Italian edition of Charles Darwin's first monograph *The Structure and Distribution of Coral Reefs, Being the First Part of the Geology of the Voyage of the Beagle, under the Command of Capt. Fitzroy, R.N. during the Years 1832 to 1836* (1842), from the collection of Marzia Rovere and Luigi Vigliotti. A comment by Rovere connects a territorial conflict around the newly emerged Graham Island, or Isola Ferdinandea, unfolding in the mid-nineteenth century in the Mediterranean, with the current claims over islands in the South China Sea.

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ERITREA
ETHIOPIA
DEEP SEA CONSERVATION COALITION
GREENPEACE
UNITED NATIONS ENVIRONMENT PROGRAMME
IUCN
KYRGYZSTAN
LIBYA
DURHAM UNIVERSITY
CENTRE FOR BORDERS RESEARCH
LIECHTENSTEIN

09

The scientific and technocratic apparatus surrounding the world's hydrosphere is largely governed by Western research institutes and companies, which have at their command the necessary know-how, technologies, and financial means to engage in these highly complex and costly projects. The International Seabed Authority (ISA), with its headquarters in Kingston, is a United Nations body tasked with the administration of resource extractions in international waters, enabled by the advancement of science and technology. As of today the high seas beyond national jurisdiction, defined as the "common heritage of humankind," remain insufficiently regulated, a conundrum explored throughout the exhibition.

A particular focus lies on Papua New Guinea, where land-based mining is threatening ecosystems, lifestyles, and health as well as economic and political self-determination. Concurrently, foreign companies are advancing plans for seabed mining in national waters. Linke documented counterinitiatives by local communities concerned about the long-term impact of these planned and ongoing interventions. The images recall the history of colonization in Papua New Guinea, ongoing economic dependency, and asymmetrical power relations.

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e rese di pubblica
di questi conglomerati, ricchi di
manganese, nickel e rame. Le scoperte di Mero furono pubblicate per la prima volta sulla rivista Economic Geology nel 1962, e tre anni dopo sotto forma di libro intitolato The Mineral Resources of the Sea. Mero prevedeva che questi conglomerati avrebbero potuto costituire un'alternativa economicamente lucrosa alle attività estrattive sulla terraferma e condurre alla chiusura delle miniere sotterranee, contribuendo a ridurre l'inquinamento ambientale sulla terra. Non tenne però sufficientemente in conto i rischi ecologici connessi all'estrazione sottomarina.
Nel 1967, l'ambasciatore maltese dell'ONU, Arvid Pardo, propose di dichiarare questi minerali "patrimonio comune dell'umanità". Nei dieci anni seguenti, l'organizzazione internazionale fu impegnata in intense trattative in seno alla Convenzione delle Nazioni Unite sul diritto del mare, allo scopo di delineare un quadro normativo che regolamentasse la proprietà e la gestione di queste risorse potenzialmente vaste, progetto che fu portato a compimento con il nome di UNCLOS nel 1982.
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EN Room 10
Manganese nodules were first noted in 1868 in the Kara Sea, in the Arctic Ocean north of Siberia. The HMS Challenger expedition (1872–76), a scientific research voyage that laid the foundation for modern oceanography, found that deep-sea mineral deposits occur in most oceans of the world. In the 1960s John Mero finished his doctoral thesis on economic interests in manganese nodules, divulging that the agglomerates are rich ores of manganese, nickel, and copper. Mero's findings were first published in the journal Economic Geology in 1962 and three years later as the book The Mineral Resources of the Sea. Mero foresaw a potentially economically lucrative alternative to land mining that could lead to the closure of tellurian mines and reduce environmental pollution on land. He did not, however, sufficiently take into account the ecological hazards caused by seabed mining.
In 1967 the Maltese ambassador to the UN, Arvid Pardo, proposed that these minerals were "the common heritage of mankind." In the following decade the UN was heavily involved in negotiations at the Law of the Sea Convention to draft a regulatory framework for the ownership and management of these potentially vast resources, which was concluded as UNCLOS in 1982.

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Manganese modules form in geochemically active layers of the seabed. Their growth is one of the slowest geological phenomena, with one centimeter of increase over several million years. The processes involved in the formation of nodules include precipitation of metals from seawater and of hydroxides through the activity of microorganisms, the return of substances to circulation in the water column, the gathering of metals from hydrothermal vents associated with volcanic activity, and the dissolution of basaltic debris.

Linke photographed this module on display at the ISA in 2016. In some areas nodules cover up to 70 percent of the seabed. To be of economic interest, however, their abundance must exceed 10 kilograms per square meter over areas of several tenths of a square kilometer.

The first deep-sea mining technologies were developed in the early 1970s, for instance, on the Blake Plateau, in the Atlantic Ocean off Florida. Technical difficulties, failure to extract larger quantities of nodules, and a lack of funding eventually led to the projects being put off until experiments with hydraulic systems began in the 1980s. Nevertheless these early pilot initiatives demonstrated that the basic approach to dredging and lifting was viable.

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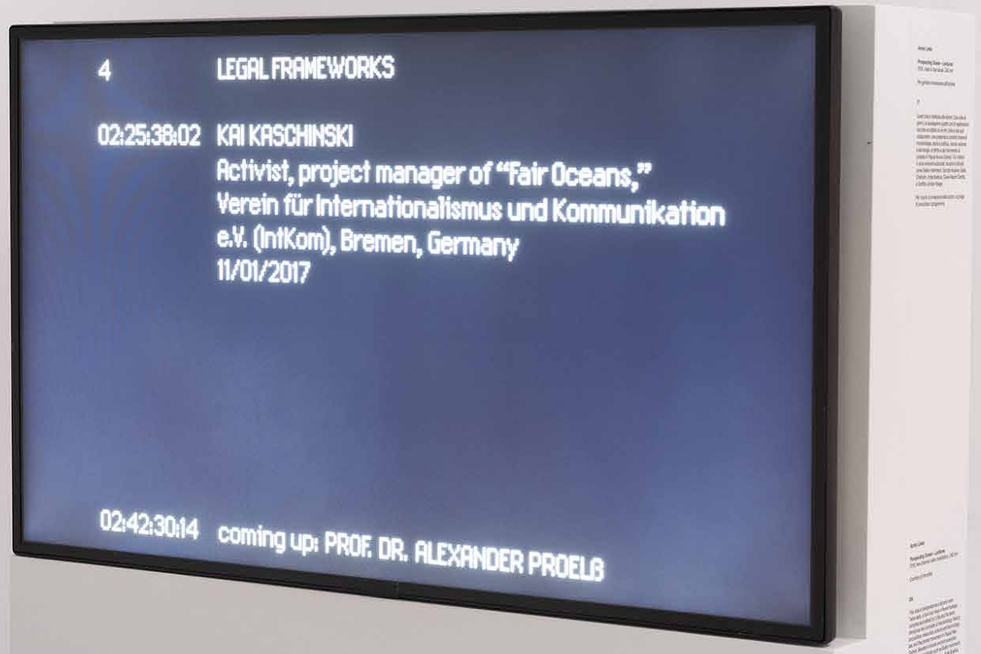
That's why coherence is a key question, the issue of how are th
how is maritime policy actually organized?"


4 LEGAL FRAMEWORKS
02:25:38:02 KAI KASCHINSKI
Activist, project manager of "Fair Oceans,"
Verein für Internationalismus und Kommunikation
e.V. (IntKom), Bremen, Germany
11/01/2017
02:42:30:14 coming up: PROF. DR. ALEXANDER PROELß

11

In the lecture room, talks by marine biologists, lawyers, policymakers, and other experts, assembled and edited by Linke, are screened twice per day in a comprehensive program.

1 Introduction

Stefan Helmreich, Professor and Elting E. Morison Chair Head, Anthropology, Massachusetts Institute of Technology (MIT), Cambridge, USA, 11/6/2017

2 Politics and Resources through History

Erik van Doorn, research associate, Walther-Schücking-Institute for International Law, University of Kiel, Germany, 2/12/2016

Dr. Matthias Haeckel, research scientist, GEOMAR Helmholtz-Centre for Ocean Research Kiel, Germany, 2/12/2016

Michael W. Lodge, Deputy to the Secretary-General and Legal Counsel, International Seabed Authority (ISA), Kingston, Jamaica, filmed at the Assembly of the 22nd Session of the International Seabed Authority in Kingston, Jamaica, 22/7/2016

Sandor Mulsow, Head Office of Resources and Environmental Monitoring,International Seabed Authority (ISA), Kingston, Jamaica, 14/3/2016

Peter Thompson, International Seabed Authority (ISA), Fiji Mission to United Nations, USA, filmed at the 22nd Session of the International Seabed Authority in Kingston, Jamaica, 12/7/2016

3 The Techno-Scientific Apparatus

Dr. Ann Vanreusel, biologist, Ghent University Marine Biology Research group, Belgium, 23/11/2016

Dr. Antje Boetius, marine biologist, HGF-MPG Group for Deep Sea Ecology and Technology, Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research (AWI), Bremerhaven, Germany, 9/1/2017

Dr. Volker Steinbach, geologist, Head of Department Energy Resources Mineral Resources, Federal Institute for Geosciences and Natural Resources (BGR), Hannover and Berlin, Germany, filmed at the workshop “Towards an ISA Environmental Management Strategy for the Area” in Berlin, Germany, 20/3/2017

Autun Purser, Biosciences Deep Sea Ecology and Technology, Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research (AWI), Bremerhaven, Germany, 9/1/2017

Dr. Ursula Röhl, marine biologist, IODP Bremen Core Repository, MARUM – Center for Marine Environmental Sciences, University of Bremen, Germany, 11/1/2017

ScD Georgy A. Cherkashov, geologist, Deputy Director, Ministry of Natural Resources of the Russian Federation, Institute for Geology and Mineral Resources of the Ocean VNIIOkeangeologia, St. Petersburg, Russia, filmed at the 22nd Session of the International Seabed Authority in Kingston, Jamaica,19/7/2016

4 Legal Frameworks

Prof. Davor Vidas, Research Professor in International Law and Director of the Law of the Sea Programme at the Fridtjof Nansen Institute, Norway, member of the Anthropocene Working Group, Chair of the Committee at the 77th

conference of the International Law Association on International Law and Sea Level Rise in Johannesburg, South Africa. Filmed in collaboration with Territorial Agency for the Anthropocene Observatory project, Oslo, Norway, 5/11/2013

Prof. Donald Rothwell, Deputy Dean and Professor of International Law with specific focus on the law of the sea at the ANU College of Law, Australian National University, filmed at the 77th conference of the International Law Association on International Law and Sea Level Rise in Johannesburg, South Africa, 8/8/2016

David Freestone, Professorial Lecturer in Law, Washington, USA, senior adviser to the USA Multilateral Office of the International Union of Nature and Natural Resources (IUCN). He is on the List of Experts in Environmental Law appointed by the Secretary-General of the Permanent Court of Arbitration in The Hague, filmed at the 77th conference of the International Law Association on International Law and Sea Level Rise in Johannesburg, South Africa, 8/8/2016

Dr. Simon Walmsley, Senior Specialist, Arctic Sustainable Development, WWF Head of delegation at the International Maritime Organisation, the International Seabed Authority and a member of the Sustainable Shipping Initiative steering group, filmed at the 22nd Session of the International Seabed Authority in Kingston, Jamaica, 20/7/2016

Kai Kaschinski, activist, project manager of “Fair Oceans,” Verein für Internationalismus und Kommunikation e.V. (IntKom), Bremen, Germany, 11/1/2017

5 Microorganisms and Evolutionary Biology

Prof. Dr. Alexander Proelß, Professor of Public Law, Public International Law and European Law, Law Faculty, University of Trier, Germany, filmed at the 77th conference of the International Law Association on International Law and Sea Level Rise in Johannesburg, South Africa, 10/8/2016

Peter R. Girguis, Professor of Organismic and Evolutionary Biology, Harvard University, Cambridge, USA, Adjunct Research Engineer, Monterey Bay Aquarium Research Institute, USA, 13/6/2017

Sallie Chisholm, Institute Professor, Civil and Environmental Engineering, Department of Biology, Massachusetts Institute of Technology (MIT), Cambridge, USA, 12/6/2017

6 Activism and Neocolonial Dependencies in Papua New Guinea

Cardinal Sir John Ribat, Archbishop of Port Moresby, Papua New Guinea, filmed at The Ocean Conference, United Nations, New York, USA, 9/6/2017

Simon Graham, engineer of the Solwara Project at Nautilus Minerals Inc., Port Moresby, Motukea Island, Papua New Guinea, 11/12/2017

Cliawi Netam Cecilia, activist in the west coast Barok area of the New Ireland Province, Kono Village, Papua New Guinea, 8/12/2017

Daniel Lavin, activist in the west coast Barok area of the New Ireland Province, Kono Village, Papua New Guinea, 8/12/2017

John Momori, activist, Caritas Coordinator for Namatanai Parish in the west coast Barok area of the New Ireland Province, Kono Village, Papua New Guinea,9/12/2017

Godfrey Jordan Abage, activist in the west coast Barok area of the New Ireland Province, Kono Village, Papua New Guinea, 8/12/2017

Prospecting Ocean

Artist	Armin Linke
Curator	Stefanie Hessler
Venue	Istituto di Scienze Marine (CNR-ISMAR) Riva dei Sette Martiri, 30122 Venice, Italy
Dates	May 23– September 30, 2018
Time	Wednesday– Sunday, 11:00–19:00 Monday & Tuesday closed Free Entry

Commissioned and produced by TBA21–Academy, in partnership with CNR-ISMAR

Prospecting Ocean emerges from Armin Linke's long-term Anthropocene research and his participation in three expeditions to the Pacific Ocean with TBA21–Academy's exploratory program *The Current*. It was first presented in an early iteration as an official project of the *Year of Science 2016*17*—Seas and Oceans, a program of the German Federal Ministry of Education and Research. The exhibition is made possible in collaboration with CNR-ISMAR–Istituto di Scienze Marine in Venice and institutions such as GEOMAR – Helmholtz Centre for Ocean Research Kiel, MARUM – Center for Marine Environmental Sciences, University of Bremen; and NTNU Norwegian University of Science and Technology.

The project has been realized in collaboration with Giulia Bruno (camera, editing), Giuseppe Ielasi (sound, editing), Renato Rinaldi (sound), and Kati Simon (project management).

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CNR-ISMAR	
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Armin Linke

Armin Linke is a photographer and filmmaker whose body of work analyzes the formation of our natural, technological, and urban environments. Throughout his twenty-year career Linke's work has investigated how humankind uses technology and knowledge to transform and develop the earth's surface. His films and photographs are observations of the changes humans have made to the land, oceans, and biosphere. Born in Milan in 1966 and based in Berlin, Linke has served as a research affiliate at the MIT Visual Arts Program, guest professor at the IUAV Arts and Design University in Venice, and professor for photography at the Karlsruhe University for Arts and Design.

TBA21–Academy

Founded by Francesca von Habsburg and drawing on her experience as a producer of cross-disciplinary art installations and socially engaged cultural programming, TBA21–Academy leads artists, scientists, and thought leaders on expeditions of collaborative discovery. Its mission is to foster a deeper understanding of our oceans through the lens of art and to engender creative solutions to the most pressing environmental issues. Led by its director, Markus Reymann, the itinerant Academy commissions interdisciplinary research that catalyzes engagement, stimulates new knowledge, and inspires artistic production. Established in 2011, the nonprofit's program is informed by a belief in the power of exchange between disciplines and in the function of the arts as a vessel for communication, change, and action.

CNR-ISMAR

The Institute of Marine Sciences (ISMAR) is a research institution that is part of the Italian National Research Council (CNR), a public organization committed to carrying out, promoting, disseminating, transferring, and improving research activities in the main sectors of knowledge growth and of its applications for the scientific, technological, economic, and social development of the country. ISMAR conducts research in the polar, oceanic, and Mediterranean regions, focusing on the influence of climate change on oceanic circulation, bio-geochemical cycles, and marine productivity; the evolution of oceans and their continental margins, studying submarine volcanoes, faults, and slides and their potential impacts onshore; submarine habitats and ecology; the increasing pollution of coastal and deep-sea environments; the evolution of fish stocks with a view to sustainability and natural and anthropogenic factors impacting the ocean.

images exhibition by Giulia Bruno